Message

From: George Allen [gallen@nescaum.org]
Sent: 2/2/2021 4:49:07 PM
To: Johnson, Steffan [johnson.steffan@epa.gov]
CC: lrector@nescaum.org; Toney, Mike [Toney.Mike@epa.gov]; Brashear, Angelina [Brashear.Angelina@epa.gov]; Holder, Amara [holder.amara@epa.gov]
Subject: RE: how does ASTM [and EPA] define "elbow"?

Hi Stef - thanks. For a 2515 tunnel that uses a T for one or both "elbows", are you able to say that tunnel would be compliant for EPA certification lab use [assuming it met the other 2515 requirements]?

Mark was "in the room" when 2515 was born and he said there wasn't much attention paid to elbow specifics [which is indeed how the method reads below]. The 2515 drawing appears to "require" a smooth curved elbow but that is a fuzzy piece given the elbow language in the method.

I did talk more with Mark today, and his thinking is that his tunnel is well mixed because his tunnel diameter and stack diameter are both 6" -- and that a stack that is a lot smaller than the tunnel diameter [eg, 6" into a 12 or 15" tunnel] will be harder to mix. He doesn't think his T is why it is well mixed, altho it might be part of why. This is very different than the approach of making the mixing section larger diameter and longer length to improve mixing.

Another difference in Mark's tunnel is that he's at 230 CFM with 6"; CS is 500 to 600 with 12"; PFS is planning on at least 600 with 12". If we need to go to at least 600 cfm to control T and water, then we probably can't go with a tunnel that is the same diameter as the 6" stack. So even if Mark is correct re: why his tunnel is mixed, we may not be able to use that approach for higher tunnel flows. Maybe by going to higher flows and larger tunnel diameters we are breaking a method that was well mixed?

All this is of current interest since we have to figure out the configuration to use for the CFD modeling very soon. With the funds currently available, we can't model a lot of very different designs.
George

At 11:13 AM 2/2/2021, Johnson, Steffan wrote:
George,
Per the method:

6.1.6.2 90° ElbowsSteel 90° elbows should be used for connecting mixing section, the sampling section, and the optional damper assembly. There shall be at least two 90° elbows upstream of the sampling section. (See Fig. 3 and Fig. 4.) The last elbow before the sampling section begins shall be of the same diameter as the sampling section straight ducting.

I think we have a bit of method defined leeway here, in that the steel 90 deg. Section is a “should”, so the clear stack design would seem to suffice, per the language.

What is unknown is whether or not either design has an impact on mixing, either positive or deleterious.

Stef
From: George Allen <gallen@nescaum.org>

Sent: Monday, February 1, 2021 7:47 PM
To: Johnson, Steffan <johnson.steffan@epa.gov>
Cc: lrector@nescaum.org
Subject: how does ASTM [and EPA] define "elbow"?

Hi Stef --I've assumed that ASTM 2515 requires an elbow in the traditional sense - the method says "Steel 90° elbows should be used". To me an elbow for this purpose is what ClearStak uses, but I don't know how ASTM defines "elbow" -- their 2515 drawing does not show an angled elbow like above, but a nice smooth bend which if taken literally is this:

Searching for ASTM [and] elbow, these are the first 2 hits I get:
https://www.octalpipefittings.com/steel-pipe-elbow/
https://www.zzfittings.com/product-details/astm-a234-wpb-elbow/

Given this fuzziness in the method, would a hard right angle piece qualify? Maybe even a T? Or taking the 2515 drawing literally, is a smooth turn required as in the 2nd pic above? We've assumed Mark's use of a T for this is not compliant, but ?? It does mix things nicely. If a T is allowed, that would solve our mixing problem -- it's a variation on the baffle theme of inducing extreme turbulence in the flow to get things mixed.

All this could affect our CFD modeling work - we don't want to model something that ends up being non-compliant in some way.
-- George